REMARKS

Claims 1-24 are pending. By this Amendment, claims 1, 7, 18, and 24 are amended, and the specification is amended to update the status of the parent application, now patented.

A corrected Application Data Sheet is submitted herewith correcting the serial number of the parent application. An updated Official Filing Receipt is requested.

Claims 1-3, 5-7, 11, 15, 16, 18-22, and 24 are rejected under 35 U.S.C. §102(b) as being anticipated by U.S. Patent 4,055,824 to Baermann (Baermann '824).

Baermann '824 is characterized in the Office Action as having a first permanent magnet 1 and a second permanent magnet 3 with a housing 7, 8. The Office Action asserts that the arrangement of magnets in Baermann '824 presents a strong magnetic field when the north and south poles of the magnets are aligned and presents a weak magnetic field when the north pole of the first magnet is in substantial alignment with the south pole of the second magnet and vice versa. However, Baermann '824 does not disclose a device that utilizes active shunting and the combination of features as claimed.

Baermann '824 discloses a magnetic switching device that utilizes **passive** magnetic shunting principles. In Baermann '824, the switching device requires the presence of two pole plates 7 of high magnetic permeability in between which is sandwiched a permanent magnet arrangement 4, the latter consisting of a plate shaped permanent magnet 1 with a central circular hole 2 and a disc shaped rotatable magnet 3 received in the hole. Both magnets are 'diametrically' polarized. It is also noted that the opposite larger faces of each magnet have different polarity (see column 3, line 54 to column 4, line 4.) Without the presence of the pole plates 7, the device of Baermann '824 would <u>not</u> be switchable between 'on' and 'off' positions (i.e., the external magnetic field present or absent), respectively, since the pole plates 7 form part of the off circuit.

Passive shunting directs magnetic energy away from a work piece into a 'trap containment' made of ferromagnetic "passive" material such as soft iron, i.e., the pole plates. A strong permanent magnet requires relatively large amounts of passive material to perform this shunting. The use of more passive materials being required is made clear in Baermann '824 at column 2, lines 61-66 where it is stated that "If permanent magnet materials with same magnetic properties are used for both the rotatable and stationary magnet, it is convenient for completely switching the holding device off to provide a pole face area for each of the rotatable magnets that is 10% grater than the face of each stationary magnet."

In distinction, as stated at page 13, lines 7-14 of this application, the claimed invention presents an arrangement that utilizes an **active** shunting technique wherein the magnetic circuit is switched from a strong external field to a weak external field by performing a magnetic short circuit using the magnets themselves, that is without the need for the presence of additional shunting components. Active shunting brings two or more magnetic fields into interaction. The total magnetic output of such an assembly will depend, for example, on the intensities, polarities, field gradients and spatial arrangements of the individual magnetic field sources. 'Passive poles' can be advantageously present for reasons explained below, and can be reduced to a minimum of mass which, in turn, is a prerequisite for retaining the highest possible magnetic force. However, they are not prerequisite for achieving 'on' and 'off' states of the switchable magnetic device. This is contrasted with "passive" shunting as disclosed in Baermann in which the ferromagnetic external poles establish a magnetic short circuit between the poles of the permanent magnets.

It will be then appreciated that switchable permanent magnetic devices employing and arranged to enable active shunting, as defined in the claims, provide an advantage over the cited prior art in that more flexible arrangements are permitted, requiring less mass to achieve 'on' and 'off' switching. In the present arrangement the permanent magnet materials

themselves perform the shunting of magnetic flux. Passive ferromagnetic circuit components are only needed to assist flux exchanges since permanent magnetic materials exhibit too high reluctances to achieve sufficient results on their own. The arrangement of the present invention, in its activated state, has the two magnetic field components acting effectively as one single magnet utilizing the whole magnetic energy with good efficiency. In the deactivated state the two magnetic fields warp literally into each other thus actively shunting themselves. The particular design allows a reduction in the ratio between active to passive magnetic material, currently believed up to a factor of 1:0.7. The maximum achievable magnetic field strength H is subsequently far less compromised.

The housing of a switching device utilizing the above mentioned active shunting can be adapted to match particular mechanical or magnetic requirements. For example, the housing design may take fully into account the field gradients around the diametrically polarized permanent magnet discs, where two cylindrical or disc-shaped, diametrically magnetized permanent magnets are arranged along a common axis. The housing may be designed, in preferred embodiments of the invention, to take advantage of flux compression techniques to maximize achievable flux densities.

Baermann '824 does not disclose an active shunting arrangement as claimed, and particularly does not disclose the claimed housing. Claims 1-3, 5-7, 11, 15, 16, 18-22, and 24 are not anticipated and are allowable.

Claims 1, 4, and 7-14 are rejected under 35 U.S.C. §102(b) as being anticipated by U.S. Patent 4,419,644 to Baermann (Baermann '644).

Again Baermann '644 discloses a magnetic switching device that utilizes **passive** magnetic shunting principles, as distinguished above. The switchable permanent magnetic holding device of Baermann '644 operates using passive shunting that requires the pole plates 1, 2 to act as part of the magnetic circuit (see Figure 1 and column 5, lines 15-31, for

example). There is no active shunting as claimed and no housing as presented in the claimed combination of claims 1 and 7. Therefore, claims 1, 4, and 7-14 are not anticipated and are allowable.

Claims 17 and 23 are rejected under 35 U.S.C. §103(a) as being unpatentable over Baermann '824.

The Office Action asserts that it would have been an obvious design choice to construct the housing Baermann '824 from soft steel, iron or a permalloy and to use rare earth permanent magnets. However, no suggestion in the prior art has been shown for making such a design choice. Further, as the magnetic assemblies of the claims and of Baermann '824 operate under different principles of shunting, such a design, even if suggested, would not result in the claimed invention. Claims 17 and 23 are not rendered obvious by Baermann '824. Claims 17 and 23 are allowable.

It is respectfully submitted that the claims are in condition for allowance and the application should be allowed. Should further issues require resolution prior to allowance, the Examiner is requested to telephone the undersigned.

Please charge any fees associated with the submission of this paper to Deposit Account Number 033975. The Commissioner for Patents is also authorized to credit any over payments to the above-referenced Deposit Account.

Respectfully submitted,
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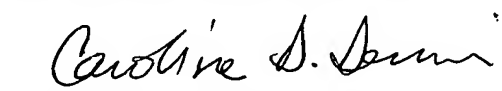

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